G-Biosciences ♦ 1-800-628-7730 ♦ 1-314-991-6034 ♦ technical@GBiosciences.com

A Geno Technology, Inc. (USA) brand name

My Genes:
The Blueprint of Life

Teacher's Guidebook

(Cat. # BE-101)

MATERIALS INCLUDED

This kit has enough materials and reagents for 30 students (six groups of five students.)

- 1 bottle Cell Lysis Solution
- 1 tube DNA Salt Solution
- 1 vial Protease: Dry Protease
- 1 bottle Precipitation Solution
- 5 Large Transfer Pipettes
- 2 Small Transfer Pipettes
- 30 Cytology Brushes
- 30 Centrifuge Tubes (2ml)

SPECIAL HANDLING INSTRUCTIONS

- All reagents can be stored at room temperature

The majority of reagents and components supplied in the *BioScience Excellence*™ kits are non toxic and are safe to handle, however good laboratory procedures should be used at all times. This includes wearing lab coats, gloves and safety goggles.

For further details on reagents please review the Material Safety Data Sheets (MSDS).

The following items need to be used with particular caution.

Part #	Name	Hazard
344P	Precipitation Solution	Flammable

ADDITIONAL EQUIPMENT

- Waterbath or beaker and thermometer

TIME REQUIRED

- **Day 1:** 2 hours

AIMS

- Isolate your own genomic DNA from your mouth

BACKGROUND

Biotechnology is one of the newest and fastest growing scientific fields that has led to many new products routinely used in our day to day lives. The simplest definition of biotechnology is "applied biology", which means the use of scientific techniques and knowledge and applying it to the development of products and new technologies. Biotechnology is more commonly referred to the use of living organisms or active molecules to make new products or control processes, such as fermentation.

The human genome contains all the necessary information to make a complete human being. The sequencing of the human genome, the holy grail of genomics, was completed on June 26th 2000. The availability of the working draft of the human genome has allowed science to identify new genes, proteins and understand genetic disease. This in turn has allowed an explosion in biotechnology, through the use of genes in recombinant DNA work and gene therapy.

This kit allows students to visualize their own genomes purified from their own cheek cells.

PRE EXPERIMENT SET UP

1. A waterbath or heating block at 50-55°C. Lower temperatures can be used, down to room temperature, however longer digestion times will be required.

2. Tube racks or floats are also required

3. Prior to the commencement of the experiment, use a large transfer pipette to add 0.75ml Cell Lysis Solution to the vial of Dry Protease to rehydrate. Fill to the graduated mark between the 0.5 and 1.0 marks. Mix by gently inverting the vial several times until a cloudy solution is visible. Do NOT vigorously shake, as this will cause foaming. This solution can be stored frozen for later use.

*Instruct students to stop eating and drinking at least **one hour** before experimentation. This helps prevent loose cells being washed away.*

MATERIALS FOR EACH GROUP

- 1 bottle Cell Lysis Solution with large transfer pipette (shared with class)
- 5 Cytology brushes
- 1 vial Protease with small transfer pipette (shared with class)
- 1 bottle DNA Salt Solution with large transfer pipette (shared with class)
- 1 bottle Precipitation Solution with large transfer pipette (shared with class)
- 5 Centrifuge Tubes (2ml)
- Marker Pens

PROCEDURE

Every cell in your body contains DNA that contains all the information to make you. This experiment allows you to purify and visualize your genome.

1. Label a 2ml tube with your name.

2. Share a large transfer pipette and transfer 0.5ml Cell Lysis Solution to a 2ml tube (fill to the 0.5 graduated mark on the tube). This solution contains detergents that disrupt the cell structure and releases the cell contents into the solution.

3. **Collect Cheek Cells**: Use the cytology brush to collect your cheek cells by scraping the inside of your cheek. Scrape the inside of each cheek; work on the area around the gum line 20 times, whilst twirling the brush between your fingers.

    *Instruct students not to scrape too vigorously. The best place for collecting the most cells is at the gum line.*

4. Place the brush in to the Cell Lysis Solution and leave in the solution for 1 minute, periodically twirl the brush.

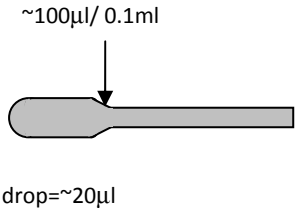
5. Remove the brush from the solution, ensuring that you thoroughly scrape the brush on the side of the tube, releasing the cheek cells into the cell lysis solution.

6. With a shared small transfer pipette, add one drop of Protease to the tube to digest the cellular material and release your genomic DNA.

7. Close the cap. Briefly mix by inverting the tube 10-15 times and then place in a 50-55°C waterbath or heating block for 1 hour.

8. After 1 hour, remove the tube and add 0.1ml of DNA Salt Solution with a small transfer pipette (see figure 1) to reduce the solubility of your DNA and allow DNA precipitation in the next step. Close the cap and invert the tube 5-6 times to mix.

Figure 1



9. Let the tube stand for 5 minutes to cool to room temperature.

10. Slowly, add 0.5ml Precipitation Solution to precipitate the DNA by using a large transfer pipette and filling the tube to the 1.0 mark. If slowly added 2 layers should form. Close the tube and slowly invert the tube 5-6 times to mix to precipitate the DNA.

    Add the Precipitation Solution slowly, close the cap then gently invert the tube slowly. All the time hold the tube up to a light and watch closely for the appearance of white strands of DNA. The appearance of DNA should occur in 10-20 seconds.

11. During the mix, hold the tube up to a bright light and carefully watch the solution and note any interesting observations.

RESULTS, ANALYSIS & ASSESSMENT

Describe what you saw in the tube after the addition of the alcohol solution:

Thin, white strands of DNA appeared. If DNA strands were not seen this is typical of too few cells collected at the start.

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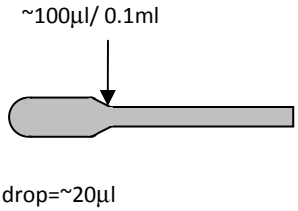

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